CHARGE NUMBER: 0108

PROGRAM TITLE: MECHANISM FOR SMOKE FORMATION

PERIOD COVERED: NOVEMBER 1-30, 1973

PROJECT LEADER: W. R. JOHNSON

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I. MENTHOL RELEASE POLYMERS[1-5]

Poly(vinyl *l*-menthyl carbonate) was prepared by the reaction of potassium menthoxide with vinyl chloroformate and subsequent polymerization of the monomer with benzoyl peroxide. The polymer was also prepared by the reaction of the menthoxide with poly(vinyl chloroformate). Both methods gave products which possessed about 1% chlorine. Otherwise, physical data indicate that the desired polymer was obtained. Calculations show that the degrees of menthol substitution obtained by the two routes exceed 0.9.

A large sample (4g) of poly(α-styryl *l*-menthyl carbonate) was prepared by polymerization of the monomer using benzoyl peroxide. The polymerization was carried out in the presence of the previously reported triphenylmethane impurity which was successfully removed from the finished polymer.

II. DIFFUSION STREAM STUDIES[6-8]

Several components of the diffusion stream were reported last month to be present in concentrations which are independent of paper porosity over the 11.8 to 36.4 sec range. Carbon dioxide has been found to give increasing concentrations with increasing paper porosity. Carbon monoxide concentrations, on the other hand, decrease with increasing porosity. This decrease is thought not to involve different diffusional behavior but is thought to result from alterations in the chemical reactions at the coal. Such alterations are most likely consequences of the oxygen supply at the coal which varies inversely with air flow through the cigarette paper during the puff.

Ratios of the diffusion stream concentrations of various gas phase components obtained from normal puffing cycles to the concentrations obtained when cigarettes are consumed statically show components to respond to changes in smoking conditions

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quite differently. The ratios were 0.9, 2, 15 and 32 for nitrous oxide, carbon dioxide, carbon monoxide and acetonitrile respectively. These differences in behavior corroborate the findings of a recent study of mainstream and sidestream smoke which show that the concentrations of some smoke components (*e.g.*, methyl chloride) in the two streams are essentially functions of tobacco consumption, while the concentrations of others (*e.g.*, hydrogen cyanide, ammonia) do not follow consumption data at all, but appear to be dependent upon different formation conditions which exist in the two streams.[9]

III. PUBLICATION

W. R. Johnson, R. W. Hale, J. W. Nedlock, H. J. Grubbs, and D. H. Powell, "The Distribution of Products Between Mainstream and Sidestream Smoke," Tobacco Science, 17, 141-144 (1973).

IV. REFERENCES

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2. T. Van Auken 6306/73-86
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4. M. Dodson 6431/40,43,46,48,51
5. G. Vilcins 6431/31
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7. R. Hale 6214/74-89
8. L. Brown 6331/21-24
9. W. R. Johnson, R. W. Hale, J. W. Nedlock, H. J. Grubbs, and D. H. Powell, "The Distribution of Products Between Mainstream and Sidestream Smoke," Tobacco Science, 17, 141-144 (1973).

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